Claims

[c1] A method for obtaining data, said method comprising scanning at least one of a head of a patient and a neck of the patient with a Multi-Energy Computed Tomography (MECT) system to acquire data.

[c2] A method in accordance with Claim 1 wherein said scanning comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data allowing computation of the cerebral blood volume of the patient.

[c3] A method in accordance with Claim 1 wherein said scanning comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data allowing computation of the cerebral blood flow of the patient.

[c4] A method in accordance with Claim 2 wherein said scanning further comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to allow computation of the cerebral blood flow of the patient.

[c5] A method in accordance with Claim 4 further comprising calculating a mean transit time of the cerebral blood flow based on the cerebral blood flow data and the cerebral blood volume data.

[c6] A method in accordance with Claim 1 further comprising performing a Compton and photoelectric decomposition of the acquired data to provide an improved gray-white matter contrast in the brain.

[c7] A method in accordance with Claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to characterize a plaque in an carotid artery.

[c8] A method in accordance with Claim 1 further comprising monitoring a CT number change in a contrast-enhanced brain study to provide improved CT number accuracy.

[c9]

A method in accordance with Claim 1 further comprising performing a Basis

Material Decomposition (BMD) of the acquired data to facilitate a reduction in image artifacts.

[c10] A method in accordance with Claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to measure a size and number of white matter lesions.

[c11] A method in accordance with Claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to measure a volume of brain atrophy in a global brain structure.

[c12] A method in accordance with Claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to measure a volume of brain atrophy in at least one brain substructure.

[c13] A method in accordance with Claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to discriminate between a Mild Cognitive Impairment condition of the patient and an Alzheimer's Disease (AD) condition of the patient.

[c14] A method in accordance with Claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data including a location of a tagging ligand.

[c15] A method in accordance with Claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a detection of a labeled drug.

[c16] A method in accordance with Claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a location of a tagged ligand with an affinity to a specific labeled drug's receptors, and a detection of the specific labeled drug to simultaneously monitor the labeled drug's distribution and the drug's effect on the kinetics of the receptors.

[c17] A method in accordance with Claim 1 wherein said scanning comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a location of a tagged ligand with an affinity to a neurotransmitter released by a specific labeled drug's receptors, and a detection of a labeled drug to simultaneously monitor the labeled drug's distribution and a concentration of the neurotransmitter.

[c18] A method in accordance with Claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a targeting agent of a tumor.

[c19] A method in accordance with Claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a targeting agent of a tumor wherein the targeting agent comprises a tumor-specific ligand.

[c20] A method in accordance with Claim 1 further comprising classifying tissue as cancerous and non-cancerous based upon the acquired data.

[c21] A method in accordance with Claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to provide an improved detection of concussion of supporting structures in the neck and fracture of the bones in the head and neck.

[c22] A method in accordance with Claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to provide an improved detection of abnormal growth on the bones of the head and neck.

[c23] A Multi-Energy Computed Tomography (MECT) System comprising:
a radiation source;
a radiation detector; and
a computer coupled to said radiation source and said radiation detector, said

computer configured to:
receive data regarding a first energy spectrum of a scan of a head of a patient;
receive data regarding a second energy spectrum of a scan of the head;
generate an image of at least one of a cerebral blood volume of the patient and a cerebral blood flow of the patient; and
calculate a mean transit time of the cerebral blood flow based on the received data.

[c24] A MECT system in accordance with Claim 21 wherein said computer further configured to perform a Compton and photoelectric decomposition of the received data to provide improved gray-white matter contrast in the brain.

[c25] A MECT system in accordance with Claim 21 wherein said computer further configured to perform a Basis Material Decomposition (BMD) of the received data to measure a volume of brain atrophy in a global brain structure.

[c26] A MECT system in accordance with Claim 21 wherein said computer further configured to perform a Basis Material Decomposition (BMD) of the received data to discriminate between a Mild Cognitive Impairment condition of the patient and an Alzheimer's Disease (AD) condition of the patient.

[c27] A Multi-Energy Computed Tomography (MECT) System comprising:
a radiation source;
a radiation detector; and
a computer coupled to said radiation source and said radiation detector, said computer configured to:
receive data regarding a first energy spectrum of a scan of at least one of a head of a patient and a neck of the patient;
receive data regarding a second energy spectrum of the scan; and
generate a location of a tagging ligand based upon the received data.

[c28]
A Multi-Energy Computed Tomography (MECT) System comprising:
a radiation source;
a radiation detector; and
a computer coupled to said radiation source and said radiation detector, said

computer configured to:
receive data regarding a first energy spectrum of a scan of at least one of a head of a patient and a neck of the patient;
receive data regarding a second energy spectrum of the scan; and
detect a labeled drug based upon the received data.

[c29] A Multi-Energy Computed Tomography (MECT) System comprising:
a radiation source;
a radiation detector; and
a computer coupled to said radiation source and said radiation detector, said computer configured to:
receive data regarding a first energy spectrum of a scan of a head of a patient;
receive data regarding a second energy spectrum of the scan;
generate a location of a tagged ligand with an affinity to a neurotransmitter released by a specific labeled drug's receptors based upon the received data; and
detect a labeled drug based upon the received data to simultaneously monitor the labeled drug's distribution and a concentration of the neurotransmitter.

[c30] A Multi-Energy Computed Tomography (MECT) System comprising:
a radiation source;
a radiation detector; and
a computer coupled to said radiation source and said radiation detector, said computer configured to:
receive data regarding a first energy spectrum of a scan of a head of a patient;
receive data regarding a second energy spectrum of the scan; and
perform a Basis Material Decomposition (BMD) of the received data to characterize a plaque in a carotid artery.

[c31]
A Multi-Energy Computed Tomography (MECT) System comprising:
a radiation source;
a radiation detector; and
a computer coupled to said radiation source and said radiation detector, said computer configured to:

receive data regarding a first energy spectrum of a scan of a head of a patient;

receive data regarding a second energy spectrum of the scan; and

classify tissue as cancerous and non-cancerous based upon the received data.